

REMARKS

Claims 1-2, 5-6, 10, 13, 14, 44-46 and 48 are pending in this application. In the Office Action dated April 11, 2005, the Examiner took the following action: (1) withdrew claims 3, 7, 8 and 16 as being drawn to a non-elected species; (2) rejected claims 1-2, 5-6 and 10 under 35 U.S.C. § 102(e) as being clearly anticipated by U.S. Patent No. 6,129,612 to Reynen et al. ("the Reynen patent"); (3) rejected claims 13-15 under 35 U.S.C. § 103(a) as being unpatentable over the Reynen patent in view of U.S. Patent No. 5,718,618 to Guckel et al. ("the Guckel patent"); and (4) rejected claims 11, 44-46 and 48 under 35 U.S.C. § 103(a) as being unpatentable over the Reynen patent in view of U.S. Patent No. 5,912,184 to Young ("the Young patent").

Applicant notes that dependent claim 12 was pending and was not specifically rejected in the Office Action dated April 11, 2005.

The disclosed embodiments will now be discussed in comparison to the cited references. It is understood, however, that the following discussion of the disclosed embodiments, as well as the discussion of the differences between the disclosed embodiments and the cited references do not define the scope or interpretation of any of the claims. Instead, such discussed differences are offered merely to help the Examiner appreciate important claim distinctions as they are discussed.

The present invention is directed to a chemical-mechanical polishing (CMP) apparatus for planarizing a microelectronic substrate. The CMP apparatus generally includes a platen having a support surface that is oriented at a non-horizontal angle, a non-continuous polishing pad adjacent to the support surface of the platen with a planarizing surface that is also oriented at a non-horizontal angle, and a carrier located proximate to the planarizing surface for biasing the microelectronic substrate against the polishing pad. The polishing pad may be an elongated web-format type polishing pad that extends from a supply roll to a take-up roll. The apparatus further includes a frame, a supply spindle coupled to the frame and positioned to receive the polishing pad, and a take-up spindle coupled to the frame and spaced apart from the supply spindle. The supply spindle is positioned above the take-up spindle, and the take-up spindle is positioned to receive a used portion of the polishing pad. The platen is coupled to the frame and positioned proximate to the supply spindle and the take-up spindle. The platen may

be oriented vertically or at other non-horizontal angles to promote the flow of planarizing fluid and suspended particulate material from the polishing pad.

The apparatus further includes a ventilation supply port proximate to the supply spindle and a ventilation exit port proximate the take-up spindle for passing ventilation gas adjacent the polishing pad when the polishing pad is supported. The supply port directs the ventilation gas generally parallel to the planarizing surface plane of the polishing pad and in a downwardly direction toward a ventilation exit port. Accordingly, the flow of gas may remain laminar as it passes over the polishing pad. An advantage of the laminar ventilation gas flow is that it can be less likely to stir up potential contaminants and may be easier to capture in the ventilation exit port. This is unlike conventional CMP apparatuses in which the ventilation gas is directed perpendicular to the polishing pad so that it forms eddies and other turbulent structures upon impinging on the polishing pad. Additionally, the combination of the polishing pad being oriented at a non-horizontal angle and the flow of ventilation gas in a downwardly direction generally parallel to the polishing pad assists in removing exhaust gas and debris generated during the CMP process.

The Examiner has cited the Reynen patent for disclosing a CMP apparatus having a planarizing medium oriented at a non-horizontal angle and the Guckel patent for disclosing a pad conditioner.

The Examiner has also cited the Young patent for disclosing an enclosure for managing environmental conditions during a CMP process. The enclosure includes an air flow management system, a valve control for balancing air supply and exhaust, and controls to regulate temperature, relative humidity and dew point. As best shown in Figures 1 and 6 of the Young patent, the air flow labeled as "A" is directed perpendicular to the surface of a workpiece of the CMP apparatus. Although the Young patent desires laminar flow of the air 12 ("A"), convergence of the air flow 12 results in undesirable turbulence around the CMP equipment. (Col. 4, lines 54-56). As shown in Figure 6, an air flow 13 that forms "a curtain of air" may be used to decrease the air pressure within the enclosure 10, which houses the CMP apparatus, in order to prevent contaminants from migrating out.

The Young patent does not disclose or fairly suggest a ventilation supply port proximate to the supply spindle and a ventilation exit port proximate the take-up spindle for

passing ventilation gas adjacent the polishing pad when the polishing pad is supported, wherein the polishing pad has a planarizing surface plane and the supply port directs the ventilation gas generally parallel to the planarizing surface plane downwardly toward the ventilation exit port. In contrast, the Young patent teaches away from such a system by disclosing that the air flow 12 ("A") is directed perpendicular to the polishing pad, thus, resulting in turbulence around the polishing pad. Furthermore, the air flow 13 ("B") is not directed downwardly. In fact, it would not be important or apparent to direct the air flow 13 downwardly adjacent the polishing pad because the purpose of the air flow 13 ("B") is simply to form an "air curtain" to prevent contamination generated during the CMP process from entering the enclosure 10.

Even assuming that the disclosure of the Reynan patent and the Young patent may be combined, there is no teaching or suggestion in either patent to position a ventilation supply port proximate the supply spindle and a ventilation exit port proximate the exit port in the CMP apparatus of the Reynan patent.

Turning now to the claims, the patentably distinct differences between the cited references and the claim language will be specifically pointed out. Presently amended claim 1 recites, in part, "a ventilation supply port proximate to the supply spindle and a ventilation exit port proximate the take-up spindle for passing ventilation gas adjacent the polishing pad when the polishing pad is supported, wherein the polishing pad has a planarizing surface plane and the supply port directs the ventilation gas generally parallel to the planarizing surface plane downwardly toward the ventilation exit port." None of the cited references, individually or in combination, disclose or fairly suggest the above limitations. Currently amended claims 5 and 44 are patentable for at least the same reasons.

Claims depending from claims 1, 5, and 44 are also patentable due to depending from an allowable base claim and further in view of the additional limitations recited in the dependent claims.

All of the claims remaining in the application are now clearly allowable.
Favorable consideration and a timely Notice of Allowance are earnestly solicited.

Respectfully submitted,
DORSEY & WHITNEY LLP



Marcus Simon
Registration No. 50,258
Telephone No. (206) 903-8787

MS:clr

Enclosures:

Postcard

Fee Transmittal Sheet (+copy)

DORSEY & WHITNEY LLP
1420 Fifth Avenue, Suite 3400
Seattle, WA 98101-4010
(206) 903-8800 (telephone)
(206) 903-8820 (fax)

h:\ip\clients\micron technology\100\500199.05\500199.05 041105 oa amendment.doc